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COTTON PRODUCTION IN INDIA

by

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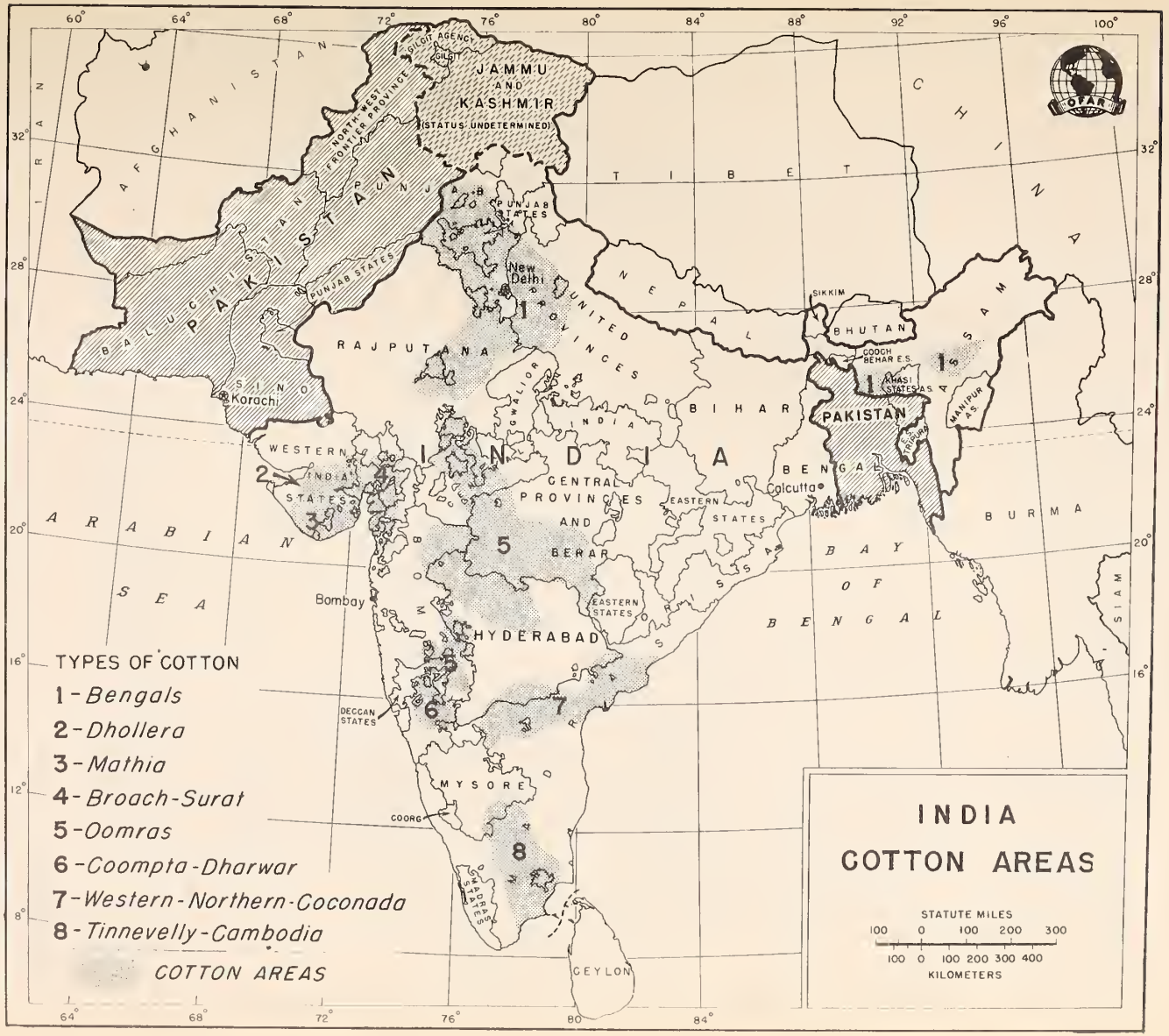
INDIA
COTTON AREAS
TYPES OF COTTON
1 - Bengals
2 - Dhollera
3 - Mathia
4 - Broach-Surat
5 - Oomras
6 - Coompta-Dharwar
7 - Western-Northern-Coconada
8 - Tinnevelly-Cambodia
COTTON AREAS
STATUTE MILES
100 0 100 200 300
100 0 100 200 300 400
KILOMETERS
JAMMU AND KASHMIR
(STATUS UNDETERMINED)
PAKISTAN
INDIA
New Delhi
Karachi
Bombay
Calcutta
HYDERABAD
MYSORE
COORG
CEYLON
RAJPUTANA
BIHAR
BENGAL
BURMA
SIKKIM
BHUTAN
NEPAL
TIBET
CHINA
AFGHANISTAN
IRAN
ARABIAN SEA
BAY OF BENGAL
SIAM
PUNJAB STATES
NORTH-WEST FRONTIER PROVINCE
BALUCHISTAN
SIND
WESTERN INDIA STATES
CENTRAL PROVINCES AND BERAR
EASTERN STATES
DECCAN STATES
MADRAS
COOCH BEHAR E.S.
KHASI STATES
MANIPUR
TRIPURA
UNITED PROVINCES
GWALIOR
INDIA
60°
64°
68°
72°
76°
80°
84°
88°
92°
96°
100°
32°
28°
24°
20°
16°
12°
8°

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COTTON PRODUCTION IN INDIA

By Henry W. Spielman

HISTORY OF COTTON IN INDIA

India is probably the oldest cotton-producing country in the world. As long ago as 450 years before Christ, Herodotus said "India has wild trees that bore fleeces as their fruit . . . Of these Indians made clothes."[1] Over a period of 2,000 years, references were made by Greek, Roman, Italian, and British historians to the cotton cloth obtained from India.

The Asiatic varieties of cotton are indigenous to India, and the Indian people were probably the first to utilize its fiber for making cloth. Undoubtedly early in Indian civilization, cotton clothing was found to be more suitable in the hot Indian climate than skins or wool. Long ago, a flourishing textile industry developed to supply this domestic market. Some cloth even found its way to African and European markets at a very early date, but on the whole such exports were small.

One of the major reasons that the East India Company entered the Indian market was to obtain cotton cloth for Britain and Europe. In fact, the Company soon encouraged cloth manufacture in India. It was through the efforts of the Company and other British interests that Bombay became one of the leading textile centers in India, as early as 1665. At this time, India was probably one of the world's greatest industrial nations and continued to be until the industrial revolution occurred in the West. From the time the spinning jenny and the spinning frame were developed, India's cotton industry declined. The West with its mechanized methods for producing cloth soon drove the Indian handmade cloth off the markets of the world, and India moved backwards from the producer of a manufactured product to the producer of a raw material.

Officials of the East India Company were quick to encourage the production of lint cotton in India for the mills of Manchester. It was largely through the efforts of this Company that better varieties were planted.

Mechanical ginning was also introduced. Attempts were made to use the Whitney saw gin soon after it was placed on the American market. Improved models were imported until about 1835. They were not extensively used, however, because they were not suited to Indian cotton. The East India Association gave a grant of £100 for the development of a gin that would be more effective. In 1862 Platt Brothers put on the Indian market a roller gin that was satisfactory. Many of the gins used in India today must be copies of those first Platt gins.

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[1] DANTWALA, M. L. A HUNDRED YEARS OF INDIAN COTTON, P.1, East India Cotton Association, Limited, Bombay.

While India was looking for mechanical means for ginning cotton, the United States was taking its cotton market both in England (table 1) and on the Continent. In 1784 a shipment of cotton from the United States was seized in Liverpool as contraband on the theory that cotton could not be produced in the United States. After the development of the saw gin for "fuzzy seeded" cotton, the United States took more and more of the European market.

The Civil War in the United States resulted in what was called the "Cotton Famine in Manchester." Mills bid up the price of cotton to unheard of prices stimulating practically every country in the world that could grow cotton to attempt to do so. This high price, coupled with the introduction of the roller gin, gave a new impetus to cotton growing in India. Its exports to Britain increased from 326,000 in 1860 to 1,307,000 bales in 1866. During this period, fortunes were made in Bombay. These fortunes laid the foundation for the textile industry that began to develop in Bombay when the United States re-entered the world cotton market after the Civil War. Indian cotton production did not decline from that time onward until World War II.

Once Indian cotton had entered the World market in sizable quantities it maintained its popularity. Before the United States Civil War, England and China were the largest buyer of India cotton but at the end of that war Europe was the principal consumer. After the turn of the twentieth century, Japan began buying more and more Indian cotton and in the early 1930's was the largest buyer.

In the early years of World War II, India was faced with a burdensome surplus of cotton, which placed a strain on the Government as well as on the cotton trade. Steps were taken to relieve the surplus by restricting cotton acreage and encouraging food-grain production. Since India was short of food, this move helped the cotton industry and improved the food situation. Unfortunately with India's increasing population and a higher standard of living for many working people, food production continues below India's requirements. There appears to be a need to continue restrictions on cotton acreage indefinitely.

TABLE 1.- *Share of United States and India in total cotton imports of Britain, 1815-59*

YEAR	UNITED STATES	INDIA
	Percent	*Percent*
1815-19	46	26
1820-24	68	9
1825-29	70	10
1830-34	79	9
1835-39	79	12
1840-44	81	14
1845-49	84	11
1850-54	78	16
1855-59	76	18

A major problem of India's cotton industry for decades was transportation. As cotton trade with the outside world developed, means for moving cotton to port had to be developed. In the early days, most cotton was produced within 25 miles of the coast where it could be gathered by country craft and other ships and shipped to Surat or Bombay. Much of the cotton was taken from the fields to the coast on the backs of oxen. The bullock cart was not widely used in India until the middle of the nineteenth century. As late as 1851, it was estimated that 1,800,000 oxen were used to haul that year's cotton crop into Bombay city. (This movement did not include the cotton brought in by sea.) Such hauling was costly and frequently resulted in deterioration of the cotton en route. The oxen were unloaded twice a day, generally at watering places where the bags of cotton were rolled in the mud. At night the cotton would be wet with dew and during the day coated with dust. The oxen often ate the seed cotton and, later when only the lint was transported, the lint.

Often, because of this form of transportation, cotton could not be moved to the nearest port. For example, the Western Ghats presented a major obstacle to growers shipping cotton by oxen from the Oomra tracts to Bombay. They had to send a large part of their cotton to Calcutta, a distance of 600 to 800 miles.

Up to the middle of the nineteenth century, India was largely a group of self-sufficient regions with few communication facilities. Only along the coast were people able to move easily from one region to another.

It became increasingly clear that if India were to hold its cotton markets, steps must be taken to reduce the cost of transportation. The first railroad was built between Bombay and Thana, a distance of about 25 miles, to a point where the Bombay group of islands was nearest the mainland. Shortly thereafter the Government of India approved the construction of railroads from Bombay to Poona and from Bombay to Ahmedabad. Both of these projects were ambitious. The Ghats had to be surmounted on the Poona road and many rivers and swamps had to be crossed on the Ahmedabad road. Shortly after these roads were started a third road was begun over the Ghats to the Khandesh and Berar cotton tracts. This road alone did much to supply cotton to Britain during the cotton shortage of the early 1860's. Later these roads were extended to other cotton areas, particularly the Hyderabad Deccan.

As these roads improved their service and in many sections built double tracks, more and more cotton moved to Bombay by rail rather than by sea. Gradually the ports in the Gulf of Cambay decreased in importance until today there is not a major port in the entire area. The development of railroads for servicing Bombay was not the only reason for the decline of the Gujarat ports. Both Surat and Broach were on rivers that were silting up. As larger ships entered the maritime service, it was impossible for them to continue to call at these ports. Because their foreign trade diminished, the local interests could not maintain their ports.

With the development of merchanized transportation, roads were built. In some sections, particularly on the Deccan, good roads were built as well as feeder roads leading into Bombay city. Before World War II, some cotton was hauled by truck into the city. Since that time, however, there has been a gasoline shortage so that little trucking of non-essential commodities is possible. In spite of progress that has been made, the road system even of Bombay Province is not adequate. For example, there is no road north from Bombay city to the Gujarat area. One can get there only by rail.

As long as cotton was moved on the backs of oxen it was impossible to press lint into bales upcountry. With the development of railways, improvements were made in packaging cotton. First, screw hand presses made what were called half bales for shipping by sea or by rail. By 1859 the hydraulic press had been introduced and was soon widely used. Gradual improvements were made in the preparation of the bales, especially those that were destined for foreign countries. Today all bales are pressed to high density at the original press. In India high density is considered 35 to 40 pounds of lint per cubic foot. Many of the mills prefer to buy loose cotton, particularly those in the cotton-producing areas.

NATURAL FEATURES OF THE COTTON AREAS

Topography

Most of the cotton area of India is level to gently rolling. On all of it, tractors and tractor equipment could be used.

In the north, cotton is grown on the plains of the Ganges, which are almost level. In Rajputana, it is grown along rivers and on the rolling and level farming regions. The Oomras tracts are part of the Deccan plateau, which is level to gently rolling. In this area some erosion is noticeable but is not serious. In the Broach, Surti, and Dhollera tracts most of the country is a level coastal plain. In the northern part of Madras and the southern part of Bombay, the cotton areas are part of the gently rolling Deccan plateau. The southern part of Madras is again almost level to slightly rolling.

Climate

Practically all the cotton area of India is within the 20- to 40-inch rain belt. Only in a narrow strip along the coast of the Broach-Surti cotton districts is the rainfall above that amount and in East Punjab below it. The Oomra, Broach, Surti, and Dhollera tracts depend entirely on the southwest monsoon for their water supply. This monsoon generally begins about the middle of June and continues until late in September. Only rarely do showers fall after October 1 in the cotton tracts. This monsoon is sometimes late, resulting in planting of cotton, which may not fully mature before the rains end. Under such conditions some cotton will be produced, but it is almost always a below-normal crop. If the rains begin early, planting is done at the usual time.

In the Jayawant area the rains are too heavy early in the season to plant cotton. Therefore, food crops are planted first and cotton later, in August, when the rains have slackened.

In the southern cotton-growing districts, cotton is planted during the end of the southwest monsoon or early in the northeast monsoon. In the last month of the southwest monsoon, considerable rain falls in Madras Province and is immediately followed by the beginning of the northeast monsoon. Only in Madras Province and in north India is any considerable acreage of cotton irrigated.

Soils

The cotton soils of India naturally vary greatly since cotton is grown over much of the western half of the peninsula. Practically all soils are deficient in organic material, nitrates, and phosphates. In the upper Gangetic plain there is a mixture of alluvial soils. In Gujarat, Central India, and the northwest Deccan, there are black cotton soils or blackerths. To the south and east of these areas there are the regions of predominately red soils on the Darwar-American, Northerns, Easterns and Tinnevelly tracts.

In the upper Gangetic plain, cotton is grown in western United Provinces, Agra, and Merut. East Punjab may be included in this area since the soil is similar. Cotton in that Province is grown on the alluvial soils of the Indus River system. Cotton may also be grown along the rivers west of Agra on soils that give the appearance of desert soils. Bengal desi cotton is usually grown on this soil although some Punjab-American is produced on the irrigated lands of East Punjab.

In Gujarat, cotton is grown on alluvial black soils, which vary from light to heavy. These soils hold moisture well, have a high lime content. They crack badly during the long dry season and become very sticky during the rainy season. The Gujarat cotton area comprises the districts around the Gulf of Cambay as far down as Broach and Surat. Dholleras, Mathias, Broach, and Surti are the main cottons grown on these soils.

In the northern part of Central India, cotton is grown on medium and light blackerths. The southern part - of heavy blackerths, locally known as black cotton soils - is now included in the Oomras tracts of the northwest Deccan. These soils crack during the hot dry months. In many respects they are similar to the black soils of Texas and Alabama. They retain moisture and are lime rich. Not all of the blackerths are deep and heavy. Medium and shallow soils occur throughout the Oomra tracts. On the uplands they are very poor and only with optimum monsoons are they moderately productive.

The Darwar-American tract (the southern part of Bombay Province and northern Mysore State) may also be called the southwest Deccan. The soils are red but vary widely in consistency, depth, and composition depending upon the rocks from which they were formed. Along the rivers the soils are dark and frequently deep, while on the uplands the soils are light and gravely.

In the northern and eastern tracts of Madras Province the soils again vary from the light red of the uplands to the deep rich brown of

the valleys. The Tinnevelly area of southern Madras Province is covered with medium-black soils. Further north and west around Coimbatore, soils are deep red loams.

PRODUCTION

Land Preparation

Cotton land in India is still plowed by ancient methods - a pointed-stick plow pulled by a yoke of oxen. This plow has been modernized only by the addition of a metal tip, which penetrates the soil easier and protects the wooden point. Generally, the land is plowed as soon as possible after the first rains. Plowing is done four times, twice lenghtwise and twice crosswise. This method breaks up the clods and makes a firm seedbed. Next, a log or heavy board is dragged over the field to further break the clods. Sometimes the land is plowed with a moldboard plow before the rains begin. This is not a common practice, however, because it requires two to four joke of oxen and most cultivators, having only one, must hire additional oxen from their neighbors when they use a turning plow.

Planting

Practically all of the cotton in India is planted in rows, generally with an indigenous one-, two-, or four-row planter.

All types of planters are similar in design. The beam, which the oxen pull, is fastened to the frame of the planter, which is generally a 4"-by-4"-piece of wood that may vary from 3 to 5 feet in length and which has a handle. To the frame are fastened "chows," which are the points that make the furrow into which the seeds are dropped. The chows generally have metal points. Immediately above the metal point, holes are drilled through the chows and one end of bamboo poles is inserted. Cups are attached to the other end. The cups may be wooden or they may be metal funnels into which the seeds are dropped by hand. At least two people are required to operate the cotton planter, one to drive the oxen and guide the planter and the second, generally a woman, to drop the seeds into the cup. A slightly different kind of planter is shown in figures 1 and 2.

FIGURE 1.- In India cotton planting is a woman's job. These four women carry the seed in a bag tied around their waist. The seed is dropped by hand down the bamboo poles, which make furrows in the soft soil.

The rows may be 12 to 24 inches wide. In some fertile cotton

areas like the Broach, the rows may be wider. Practically all of the cottonseed planted in India is slick so that there is little danger of the planter becoming clogged with seed. It is necessary to inspect the bottom ends of the planters occasionally to see that the seed holes are not closed.

FIGURE 2.- After the cotton seed is dropped into the furrows, a log is pulled over the ground to cover the seed.

Fertilizers

All fertilizers, by law, must be used on food crops. When cotton prices, as compared with food prices, are high, some fertilizers will be used on cotton, but this condition has not existed in the past 2 years. In areas where the cotton crop follows jowar, cotton does benefit indirectly from fertilizers used on jowar since not all of the plant food would be used or leached out of the soil before cotton is planted.

Thinning

Thinning may be done with a short-handled hoe or with a kharpa. If the hoe is used, the worker bends over to chop the surplus plants out of the rows. A more common practice is the use of the flat-bladed, short-handled kharpa. The worker squats between the rows and cuts the surplus plants by pushing the blade through the stalks.

Cultivating

Cultivation is generally done with animal-drawn equipment until cotton is too high for the animals to walk between the rows. Most of the "cultivators" are a type of scraper, which is a blade 12 to 18 inches wide than fits between the rows of cotton. As the blade is pulled through the rows just below the surface of the soil, it cuts the stalks of the weeds. The number of cultivations depend upon the amount of rain and general growing conditions. But usually four times are sufficient to keep the weeds in check.

Picking

By picking time the monsoon has ended and there is little likelihood that further rains will fall. Consequently, picking is leisurely. One

person usually picks 40 to 60 pounds a day. Pickers do not use cotton picking sacks as in the United States nor baskets as in Brazil but use part of their clothing, the sari (fig. 3). It is a long piece of cloth that is wrapped around the body with part of it thrown over the shoulders or head. This long headpiece is tied so as to form a pocket in the back. As the cotton is picked, it is put in this pocket.

Because of the small size of the farms, most of the crop is picked by the farm wife, her children, and neighbors of the pickers may be hired.

Yields

In India, average yields per acre for cotton are the lowest in the world. The average yield for Indian provinces is 86 pounds per acre. for states 84, and for Hyderabad 59 pounds per acre (table 2). In some areas, such as Broach, yields are considerably higher than the average. Low yields may be attributed to continuous cropping of the land and to the use of fertilizers only on food crops.

Other Crops Grown with Cotton

In all of India, cotton is grown in rotation with other crops. In the major cotton areas, it is grown with jowar and, in the Deccan, peanuts are added to the rotation. In Madras Province, irrigated cotton is grown in rotation with rice or other cereals, such as millets.

Frequently the cotton field will have two rows of jowar planted between every sixth to tenth row of cotton. This rotation is fixed to insure some food for the cultivator. Most cultivators will plant food grains in preference to a cash crop because it is cheaper to raise food than to buy it.

TABLE 2.- *Cotton yield per acre, average for Provinces, States, and Hyderabad, 1936-37 to 1945-46*

YEAR	INDIAN PROVINCES	INDIAN STATES	HYDERABAD
	Pounds	*Pounds*	*Pounds*
1936-37 to 1938-39	81	79	62
1939-40	88	74	63
1940-41	97	86	63
1941-42	91	90	66
1942-43	78	81	66
1943-44	88	102	55
1944-45	82	80	52
1945-46	81	80	48
Simple average	86	84	59

Source: Estimates of area and yield of principal crops in India, 1936-46, Ministry of Agriculture, Government of India, Delhi, April 1948.

Planting and Harvesting Periods

Cotton is planted from April through November and harvested from September through July (table 10). In the important Oomras tracts and northern Bombay Province, planting is done from June to July and harvesting from October to March.

INSECTS AND DISEASES

Insects

In India, insects damage native cottons less than American cottons. Insects causing the greatest damage are the pink bollworm, *Platyedra gossipiella S.*, the spotted bollworm, *Earias Fabia S.*, the stem weevil, *Pempherulus affinis F.*, and the leaf hopper, *Empoasca devastans D.* Minor insects that damage cotton are plant lice and the leaf roller.

The pink bollworm causes considerable loss to the crop and lowers the quality of the lint by staining the cotton in the bolls. It is found throughout India but does less damage than in Mexico or Brazil.

The spotted bollworm bores into the stems of young cotton and into the bolls during the fruiting period. It causes less damage than the pink bollworm.

The stem weevil destroys the stem, as the name would indicate. Its damage to the total Indian crop is not great since it does not attack the indigenous cottons as readily as the Americans. Some years it destroys as much as 25 percent of the Cambodia crop.

The usual sprays have little effect upon these insects. To control them the various legislatures have enacted laws that require cultivators to destroy their cotton plants by a specified date, which naturally varies with the date of maturity of the cotton grown in various regions. Fortunately, most of the insects are destroyed by this method. Nature also helps to reduce the number that survive from one season to the next. During the hot dry months, practically all plants cease to grow and most of them die, thus removing all host plants. In addition, the hot dry weather itself will kill many insects as well as destroy their eggs.

FIGURE 3.- Cotton picking is done by women and children. The women use part of their sari as a picking bag. The sari is tied around their waist and fastened over their shoulders, forming a pouch on their backs.

Plant breeders have been successful in developing varieties of cotton resistant to some of these insects. A local variety was crossed with the Brazilian Moco to produce a cotton that exudes a gum that engulfs and kills the stem weevil larvae. Unfortunately, this variety is not widely grown and might still be considered in the experimental stage. Other varieties have been developed that have a certain amount of resistance to leaf hoppers. It was found that the density and length of leaf hairs proved a retarding influence upon the damage caused by this insect.

Diseases

Of the cotton diseases found in India only wilt and root rot might be considered important. All indigenous cottons are attacked by both diseases while American cottons are susceptible only to root rot. Both of these diseases are soil borne and persistent, which means that they are extremely difficult to exterminate once the soil has become infected. The use of resistant varieties is the only solution to the problem of controlling these diseases. Considerable success has been obtained in developing wilt-resistant varieties but to date no variety has proved resistant to root rot.

Soil and climatic conditions limit the distribution of root rot and wilt in India. High soil temperatures, such as are found in the Punjab and Sind, favor the development of root rot. Wilt, on the other hand, is found in other parts of India where the soil temperature during the growing season is considerably lower.

These two diseases may be found on the same soil, but root rot is more common in alluvial soils and wilt, in clay soils.

Dry rot, anthracnose, and red leaf blight are the only other diseases of any importance. Red leaf blight attacks American cottons. All of these diseases cause damage only during years of heavy and continuous rainfall.

GINS

About a hundred years ago saw gins were tried and found unsuited to Indian cotton. Since then roller gins have been used exclusively on cottons native to India and on those developed from American seed in all parts of India, except the Punjab and Sind. When the Punjab was divided, a few saw gins remained in East Punjab where small quantities of American-Punjab cotton are grown.

Cotton gins (fig. 4) are owned by local merchants, textile mills, and larger merchants in Bombay. Many of the smaller upcountry ginners do not press their cotton but sell it loose to textile mills or for extra factory consumption (fig. 5). Other ginners send their lint to pressing plants for baling. As an indication of the proportion of gins to presses in East and West Khandesh, there are 233 ginneries and only 80 presses.

FIGURE 4.- In India, cotton gins are called ginning factories. Most of them are large buildings and give the impression of being a factory.

FIGURE 5.- This cooly is carrying about 200 pounds of lint cotton from a custom gin to a textile mill where it will be used as loose cotton.

Pressing charges are the same as ginning charges. In 1948 they amounted to $1.67 a bale for each service. Pressing also includes bagging and ties and identification. Practically all bales in India are pressed to high density; that is, 35 to 40 pounds per cubic foot.

Even when there is a press and a gin in the same compound, lint cotton is frequently stored for some time before pressing. If there is sufficient dew fall, the dry cotton absorbs moisture from the air. If the weather is unusually dry, a fire hose may be used to sprinkle the ground and occasionally some of the water may be sprayed directly on the cotton. Seed cotton is also stored in the open (fig. 6).

FIGURE 6.- Seed cotton is stored in the open in piles according to grade. Baskets are used both to carry the seed cotton to the pile and from pile to the cotton gin.

FIGURE 7.- When a new variety is introduced into an area, the bales of lint cotton are specially marked with a large cardboard tag issued by the Indian Central Cotton Committee. The above cotton specialist has just supervised the fixing of the tags on these two bales. Generally such cotton brings higher prices.

Before pressing, the cotton is generally passed through a cleaner to remove some of the trash in the lint. This cleaning process also enables the dealer to mix various qualities of cotton so that he has a uniform bale. In some sections, such as the Jarila tracts, short-staple cotton may be mixed with the longer Jarila. This practice was particularly encouraged when the futures contract in Bombay called for the delivery of 3/4-inch staple. Jarila normally staples 25/32 to 13/16. After the futures contract was raised to 25/32, the practice of mixing declined somewhat. Unfortunately, in these tracts, particularly in the Central Provinces and Madhya Bharat, two or more varieties of cotton are grown. The local governments have not as yet enforced laws against mixing nor have they enacted one-variety laws limiting the production of cotton to the variety best adapted to the area.

HANDLING COTTON

Indian cotton bales are completely wrapped in burlap and tied with three straps of metal (fig. 7). Each of these straps is wrapped around the bale about three times giving the appearance of nine or more bands on the bale. No buckles are used, but the ends of straps are tucked under so that they do not slip. Each bale is marked with the gin bale number, the pressing bale

FIGURE 8.- By the time Indian bales are ready for export, they are sampled many times and take on the appearance of an American export bale.

number, the number of the gin and the number of the press, and generally the quality of the cotton, or the trade name.

Once the bale is pressed, it is not sampled until it is ready for sale either to a mill or an export merchant. The sampling generally takes place in Bombay or some other central market. Samples are not taken from every bale but from random bales out of each sales lot. For example, if a buyer purchases 100 bales, a 4- to 8-pound sample would be removed from 2 or 3 bales. To obtain these samples the bales are broken open and the cotton removed from the center of the bale (fig. 8). If there is any reason to suspect a lot is not uniform, samples may be drawn from other bales. When lots are suspected of being thoroughly mixed, small samples may be drawn from every bale in the lot. This situation rarely occurs, however.

MARKETING

How the Grower Sells his Cotton

Growers sell their cotton in a variety of ways, depending on the cotton area and local customs. About 70 percent of the crop is sold by cultivators in village markets but much of it is resold in the town markets.

In the villages the local buyer may be a small local merchant or a traveling buyer. The traveling buyer usually purchases from local merchants as well. This buyer may operate on his own account, for a merchant in the town market, a ginner, a millowner, or even a Bombay merchant or exporter.

The village money lender rarely takes part in the marketing process. But the cultivator may agree to sell his cotton to the local merchant or a ginner who advances him funds for seed and other expenses directly connected with crop production. The price for the cotton is generally not fixed at the time of making the loan. In practically all cases the cultivator agrees to deliver the seed cotton to the nearby market, a concentration point such as the railroad, or directly to the cotton gin. The delivery point may be 20 to 30 miles from the cultivator's village. Since the trip is made by oxcart, many cultivators spend as much as a week delivering their load of cotton to the buyer.

The town markets are well organized and regulated. In Hubli, Bombay Province, for example, the marketing area is near the edge of the city and covers about a square mile. Roughly 70 cotton brokers have their offices on the grounds and many of them have warehouses attached to their offices. There is also a large area where cultivators and other owners of cotton take their cart loads of cotton for display and sale (fig. 9). There are frequently three or four double rows of carts tipped up on one end so that buyers can examine the quality of the seed cotton. Few cultivators sell their cotton direct to buyers. Generally they sell through a broker. The broker, like a commission man on a livestock market in the United States, attempts to obtain the highest price for the cultivator. The various buyers in the market will bid on the cotton as the broker takes them around to the cotton consigned to him.

In this market, bids are made by a curious system that is used widely in India. The broker covers his hands with a piece of cloth and each

FIGURE 9.- Seed cotton is taken to public markets in bullock carts where it is sold at auction through brokers.

buyer in turn conveys his price by means of a code using finger signs. After the price is conveyed, there may be a long discussion of the price without mentioning a specific figure. If a buyer desires to revise his bid, he again covers his hands and passes the new price under cover. If the cultivator thinks the price is too low, he may ask the broker to store the cotton and sell it later. The broker weighs the cotton for both the seller and the buyer. He is supervised by the market organization that enforces fair weight regulations upon its members or by provincial government legislation controlling the weighing system for a particular market. No attempt has been made to enact uniform weight laws for an entire province.

In addition to brokers, there are cooperative selling societies that are designed to reduce the cost of cotton marketing and insure a higher price for the cultivator. The Indian Central Cotton Committee in cooperation with some provincial and state governments organized 104 of these societies.

The Gadag Cooperative Cotton Sales Society Limited, Gadag, Bombay Province, might be taken as representative of the better type of such sales organizations. This farmer-owned and farmer-controlled cooperative with 2,300 members sells cotton by auction. When the farmer delivers the seed cotton to the cooperative, it is graded by an officer of the cooperative and piled according to grade. Each cultivator's cotton is weighed so that a record is kept of his contribution to each grade. When a sufficient quantity of cotton is available, an auction is called. All of the buyers in the area are notified of the time of sale and are sent a list of the qualities offered. Some of the buyers arrive about an hour before the sale begins and examine the cotton. Now that the society has been in operation for 30 years, most of the buyers recognize the grade designations of the cooperative without examining the cotton. At the time of the auction, samples of the cottons being sold are shown the buyers.

The auction takes place under a shed where the chairman and secretary sit at tables. The buyers sit in chairs or on the floor. After the buyers have examined the samples, the chairman calls for bids. Frequently

the bidding is lively, especially for the better qualities. If the chairman thinks the price is too low, he may refuse to accept the bids and hold the cotton over for the next auction. Through this type of selling the cultivator is paid for the quality of cotton he produces and receives the highest price paid for his particular quality. Through this market, most of the Dharwar-American cotton is sold. The name of the cotton is protected as well as the purity.

Most of the buyers bid on the lint as well as the seed. The only exception is when improved seed cotton is being sold and the seed is to be used for multiplication purposes. Then the buyer bids only on the lint. This cotton must be ginned separately under the supervision of a representative of the Indian Central Cotton Committee and the seed must be taken by the Committee for distribution among cultivators during the next season.

A third type of cotton marketing is found in the Surat district. Within 35 miles of Surat City, there are five cooperative cotton gins owned by cultivators. These gin associations were also organized by the Indian Central Cotton Committee. The gins process the cultivators' cotton and pool the bales for joint sale. The pool market is in Surat City where the bales are arranged by grades and auctioned to the highest bidder. Both cotton merchants and mill buyers from Bombay and Ahmedabad as well as other centers attend the auction. At times, prices are higher than those paid for spot cotton in Bombay. This market is one of the few in India where cultivators sell their cotton after it is ginned.

In both types of auction markets the cultivators receive the average price for the grade of the cotton they supplied the market. Payment is made as soon after the sale as possible, generally the day of the sale.

How the Ginner Sells His Cotton

Cotton ginners sell their cotton direct to mills or to cotton merchants in Bombay or ship it to Bombay for sale on the spot market. A few ginners are also traders on the futures market and may use their cotton to deliver against futures contracts.

In buying cotton, a ginner studies the quality of the seed cotton by pulling the staple length and inspects the amount of dirt and trash on the lint. He will also consider the ginning percentage in determining the price. The Indian Central Cotton Committee announces the ginning percentage for the various varieties of seed distributed throughout India, and the ginner uses this ginning percentage in his calculations. In some cases where the seed may be "running out," however, he may gin a small amount of cotton to estimate the ginning percentage before deciding on a final price.

Since seed is not crushed for oil in India, there is no occasion to consider the oil content of the seed in arriving at a price. Except for planting, all seed is used for cattle feed so that the price varies only with the demand by cattle owners. The seed price is not a major factor in ginning operations in India.

The number of transactions that take place between the sale by the cultivator and the purchase by the mill owner or exporter varies greatly. It would be safe to say that the number would probably average between three and four. In recent years, a number of Bombay merchants and

exporters have sent their buyers throughout the major cotton-producing areas to buy either directly from cultivators or from village merchants. During the past year, mill buyers have also entered this field and were so successful that many of the Bombay merchants found it next to impossible to buy enough cotton to operate their cotton gins.

Prior to the 1948-49 season, it was estimated that 45 percent of the cotton in the Oomra tract was purchased by foreign cotton merchants, 30 percent by other Bombay merchants and textile mills, and only 25 percent by local merchants.

Because of the inadequate system of Government crop reporting, the major cotton firms in Bombay City maintain an upcountry organization to obtain information on the acreage, weather conditions, crop conditions, estimated yields, and other factors affecting the crop. The Cotton Committee carries on similar activities on a less extensive scale in the major cotton-growing areas. When it issues its reports therefore, they are based not only on the Committee's own reporting system but on that of the big companies as well.

Futures Market

The East India Cotton Association maintains a future market in Kalbadevi, Bombay. Trading is similar to that of other futures markets in the world.

Prior to the war, there were three futures contracts, "Broach," "Oomras," and "Bengals," which practically covered all the cottons grown in the country. Due to the change in the character of the crop in recent years and the switch to longer-stapled varieties, a new contract called the Indian Cotton Contract was developed in 1942. Jarila, grown in the Khandesh districts of the Bombay Province, was considered fairly representative of the Indian cotton crop and accordingly was constituted as the basis. Certain modifications were made last year. Currently the basis is "machine ginned" Jarila of 25/32-inch staple and fine grade grown in the Khandesh districts. Verum, Cambodia, Upland, and Gaorani cottons from the Oomras tracts are tenderable against the Indian Cotton Contract. For other cottons, delivery contracts can be entered into at agreed premiums over the Jarila futures quotations.

There are four delivery months: February, May, July, and September. The seller can deliver cotton between the 7th and 25th of the delivery month. Failure to tender the cotton subjects the seller to a penalty of $1.57 per candy over the spot price fixed by the Association on the last delivery date. (In the Bombay market, prices are quoted for candies of 784 pounds net.) Cotton deliveries must be made in Bombay warehouses. In view of the present transport difficulties, the Association now permits deliveries at specified upcountry markets.

If the buyer and seller cannot agree on delivery, the dispute is referred to the Association for arbitration. For this purpose the Association maintains a staff of surveyors who are not traders or brokers but specialists in their fields.

The over-all control of futures trading is regulated by the Bombay Government. Any changes proposed by the Association must first be approved by the Provincial Government.

Trading is subject to the maximum and minimum prices fixed by the Government of India. Whenever the quotation touches either point, a bell rings and trading stops.

Bombay Spot Cotton Market

All Bombay cotton merchants as well as many mills maintain offices in the building that houses Bombay's spot cotton market. Usually the seller carries his samples from office to office where the interested buyers inspect and bid on the cotton. The samples generally average 10 pounds from 3 bales for lots of more than 50 bales. If the buyer is interested, he returns the samples and a price is agreed upon. The delivery terms are usually Bombay warehouse, actual tare, delivery weights with payment in cash within 2 days of the acceptance of delivery. The warehouses are located in Sewri within the Port Trust area and all are within a half mile of the spot cotton market. The transactions are made direct without the benefit of a commission man or broker. The only exception would be when one exporter sells to another through a broker.

COTTON CLASSIFICATION

Grade

There are several standard grades for Indian cotton. The boxes for these grade are prepared annually and might not be identical with the boxes for the preceding season. In general, however, they are fairly uniform from year to year. It is exceedingly difficult to compare the grade of Indian roller-ginned cotton with American saw-ginned. One of the cotton companies has made the following comparisons, however, which they consider merely an approximation:

India	United States
Super-choice	Middling
Choice	Strict Low Middling Bright
Extra Superfine	Strict Low Middling
Superfine	Low Middling Bright
Fine	Low Middling
Fully Good	Good Ordinary
Good	Good Ordinary

Staple Length

Indian cotton is classified by staple lengths of 1/32 to an inch. It has been customary, however, to classify Indian cotton slightly shorter than cottons classified in the United States. For example, an American classifier may designate a sample as 15/16 of an inch while the Indian classifier would consider the same sample 29/32.

Indian Commercial Cottons

The commercial designations for Indian cottons have a historical background. Bengals, for example, were originally produced in Bengal Province. Oomras was a general description derived from the name of the city Amraoti, sometimes called Oomravati. Other cottons, such as Dholleras, Broach, Surat, and Comptas derive their names from the ports

through which they were exported. In South India, "Tinnevellies" describe the cotton produced in the district by that name. Northerns and westerns indicate the region from which the cotton came in relation to Madras City.

Bengala. - Bengal cotton is genetically known as *Gossypium Neglectum.* It was originally grown in the Province of Bengal but gradually moved up the Ganges valley to northwestern United Provinces and East Punjab. Bengal cotton has a high ginning percentage, short staple length, and is not more than 5/8 of an inch. It is coarse and almost invariably stained by the pink bollworm. In East Punjab and the neighboring districts of Rajputana, Bengals are extremely rough, bulky, bright, and clean with the highest quality grade of choice. This quality is rarely used by Indian mills but is sold to the United States, Canada, the United Kingdom, and Holland for mixing with wool in the manufacture of blankets and rugs. During 1947-48, about 20,000 bales of this quality were produced. It is gradually becoming displaced by American-Punjab seed known as LSS.

A second type of Bengals is short staple but a medium roughness grown in East Punjab and, to a certain extent, in the United Provinces. The Punjab group is known as Punjab desi and ranges in quality from good to extra superfine. The group in the United Provinces is generally lower in grade. Part of this type of Bengal cotton is consumed by Indian mills.

In Rajputana, below the rough Bengal producing area, Bengals are one variety that is medium rough and may reach a grade of super choice. It is also being displaced by American-type seed. A second type of Bengal produced in Rajputana is silky and has the longest staple of all types of Bengals. It is slightly lower in grade, but its staple length frequently reaches 5/8 of an inch. A part of this cotton is hand ginned and consequently contains a larger amount of leaf.

Assam Comillas. - The Assam Comillas are similar to Bengals but rougher. In this respect they resemble Chinese cottons. The grade frequently reaches super choice, and the cotton is generally very white in color.

Oomras. - Oomra refers to the general area of Central Provinces and Berar, northern Hyderabad State, East and West Khandesh of Bombay Province, and Madhaya Bharat. Most of the cottons grown in this area are derived from *G. Herbaceum.* In this district, both short- and medium-staple cottons are grown. The short staples are generally known as Oomra desi but are frequently subdivided into the districts from which they originated. Most of the desi cotton varies in staple lengths from 5/8 to 11/16 and will spin from 12s to 16s yarn. It has a high ginning percentage, is white to creamy in color, and tends to be silky. Before the cotton shortage in India, this cotton found a ready market in the United Kingdom, the Continent, Japan, and China. The most widely grown Oomra cotton is known as Jarila. It was derived from Verum cotton, which was widely grown in the area. At present, about 35,000 bales of Verum are still produced in the Jarila areas. Jarila is a bright white and fairly clean cotton with good body and a staple length of 25/32 to 13/16. It is generally considered capable of spinning 24s yarn count.

Minor varieties also grown in the area are Malvi, Gaorani, and Buri. Malvi has a staple length of 7/8. Gaorani produced in Hyderabad

also has a staple length of 7/8. A small portion of this variety is hand ginned and sold to mills in the southern part of India. Buri is produced in the Central Provinces and to a limited extent in the Madhya Bharat states. It is derived from American upland seed and capable of spinning up to 30s yarn.

Dholleras. - Dholleras are grown in the Saurashtra and Ahmedabad districts of Bombay Province. Its main characteristic is that the bolls do not open when ripe. Therefore, it is inevitable that a large amount of leaf and dirt will be contained in this cotton. Improved strains have a staple length varying from 11/16 to 3/4 of an inch. The cotton is silky and soft and will spin 14s to 16s yarn. It is largely consumed by the mills in Ahmedabad.

Mathia. - Mathia is grown in the southern part of Saurashtra. It is leafy and often stained, dull greyish in appearance, and generally contains a considerable amount of sand and dirt. It staples up to 5/8 of an inch and is used in spinning 10s to 12s count.

Broach Vijay. - Broach Vijay is grown in the Broach district and Baroda State. It is considered one of the finest cottons produced in Bombay Province. It is bright in appearance and is generally clean. The fibers are silky and soft but strong. The staple length varies from 25/32 to 7/8.

Surti. - Surti cotton is grown in the Surat district. The variety most widely grown at present is 1027 ALF. It is a bright white cotton, very clean and silky. It has a uniform staple length that varies from 7/8 to 31/32. Fiber strength is considered good. It spins up to 30s yarn. Suyog is rapidly displacing 1027 ALF because it is more suited to the Surat district. In addition to having all of the characteristics of 1027, it has a higher ginning percentage and is resistant to wilt. In 1948-49 the production of Suyog exceeded by nearly three times the production of 1027.

Comptas. - Jayawant cotton is the most important of the two cottons produced in the Compta area of the southern part of Bombay Province. It is resistant to wilt. The lint is whitish in color and may reach extra superfine in grade. Its fiber is strong and staples from 27/32 to 15/16 inch. Dharwar-American, or Gadag No. 1, is derived from American seed. It has a high ginning percentage and varies from fine to superfine in grade. Its staple is short, however, ranging from 3/4 to 13/16 of an inch.

Tinnevelly. - Tinnevelly cotton is grown in extreme southern India. It is white to slightly cream in color, has a slightly rough feel, and has a staple length of about 3/4 of an inch. Production is gradually diminishing in favor of Karunganni, which is considered the best indigenous cotton of south India. It is brighter and softer than Tinnevelly. It may be superfine to extra superfine in grade and has a strong fiber, which staples 25/32 to 15/16 of an inch.

Westerns. - The most common cotton produced in the western districts is known as "Western Farm." It is slightly cream in color and soft and has a staple varying from 25/32 to 27/32.

Northerns. - Northern cotton is bright white to creamy white in color and soft. Its staple is fairly strong and may reach 7/8 of an inch. Little breeding work has been done to improve this cotton.

Coconada. - Coconada is grown in the northeast part of Madras Province. The color varies from light brown to deep red. Most samples contain considerable amounts of leaf. Coconada has a silky, strong fiber varying in length from 5/8 of an inch to 15/16. It is the only "colored" cotton grown in India. The present production, however, amounts to only 10,000 bales.

Cambodia. - Cambodia is a cotton derived from American seed and is grown both under irrigated and rainfall conditions. The rain-grown cotton, distinctly inferior to the irrigated cotton, varies in staple length from 5/8 to 7/8 of an inch. The irrigated crop varies from 3/4 inch to 1-1/8 inches, depending on growing and cultivating conditions. Considerable research has been done on this cotton, and a variety known as CO4 may some day supply a considerable proportion of India's requirements of medium-staple cotton. A cross known as Masipattam Cambodia was made between the original American cotton and the Uganda cotton. Its staple length exceeds 15/16 of an inch. The lint is bright cream and soft.

WAREHOUSES

For the past 150 years, Bombay has been the principal Indian port for both the importation and the exportation of cotton. In some years 4 to 5 million bales moved through this port. Early in the history of Bombay the trade recognized the need for adequate warehouse space. And because of the monsoon, which generally lasts from June through September, the cotton trade insisted upon the construction of rainproof warehouses. The Port Trust, therefore, constructed stone warehouses with tiled roofs and metal fire doors separating the various sections. Practically all of the public cotton warehouses are located in the Port Trust area at Sewree, all within a mile of the spot cotton market. The various cotton merchants in Bombay lease these warehouses for storing their cotton before shipment to domestic mills or for export.

Warehouses upcountry vary in construction from open sheds to stone buildings similar to those of the Port Trust. Most of the uncountry warehouses are owned by local cotton buyers, cotton gins, or textile mills. There are no public warehouses, but owners occasionally lease them to cotton merchants. In certain town markets, brokers maintain warehouses for temporarily storing their customers' cotton. These warehouses are generally small and hold only a few hundred bales.

INDIAN CENTRAL COTTON COMMITTEE

The Indian Central Cotton Committee was founded in 1923 to coordinate and unify the cotton work being done throughout India. Its formation grew out of a long felt need. Cotton improvement work was begun by the East India Company soon after its arrival in India. This work was carried on and expanded by many private individuals, companies, and provincial and state experiment stations. It has long been recognized that there was no central clearinghouse for the exchange of information among scientists working on cotton. In addition, it was recognized that there was a need for considering other groups interested in cotton but not given a voice in the work that was being done.

The Cotton Committee is composed of Government officials, scientists, planters, exporters, merchants, and millowners. The chairman at the annual and semiannual meetings is generally a representative of the Government of India. The Committee hires a permanent secretary who, in many cases, may have been an outstanding plant breeder of demonstrated administrative ability.

Since the entire cotton trade is represented on the Committee, it can draw up a program that is acceptable to all members and can direct the work of the cotton breeders along the lines that reflect changes in the demand for different qualities of cotton. Since all of the cotton work from breeding through seed distribution is under the supervision of the Cotton Committee, it is easier to develop an effective program for cotton improvement in India than in most other countries.

COTTON IMPROVEMENT AND SEED DISTRIBUTION

The Indian Central Cotton Committee in cooperation with provincial and state governments maintains 13 cotton experiment stations in the major cotton-producing areas of India. There is no one central station for conducting work that would apply throughout India. Each station specializes in the types of cotton most suited to the area surrounding the station. The only possible exception is the Surat station where hybrids of Asiatic and American cotton are being developed. As promising hybrids are produced, seed is sent to other stations where experiments are carried out on its suitability to local conditions.

Most experiment stations have a cotton specialist who is responsible for distributing improved seed to cultivators. This specialist is generally not a cotton breeder but more like an extension worker. He is employed by the Cotton Committee and is responsible to it. However, he works in close cooperation with the district agricultural officers and the extension services of the various provinces and states. This cotton specialist gets cultivators to multiply the seed that has been developed by the experiment station. Generally he has four groups of such multiplication farms. The first group receives the seed direct from the experiment station and plants it under the supervision of the cotton specialist. He and his assistants rogue the fields to remove any off-type plants that may appear. After the cotton is mature, it is picked under the supervision of the cotton specialist and sold to a buyer who agrees to gin the seed separately and deliver to the cotton specialist. The cultivator receives about 15 percent more for his seed than if he had sold it on the open market. The second group increases the seed from the first-year group, the third group from the second, and the fourth from the third group. The methods used for protecting the purity of the seed are the same as for the first group. By the fifth year, there is generally enough seed to plant at least half of the cotton area of a district. After that the Cotton Committee assumes that the seed will be distributed widely throughout the area through what it calls "natural spread."

With such close supervision of the multiplication and distribution of improved cottonseed, it is doubtful that a system of certifying seed like that in the United States would be suitable to Indian conditions.

The cotton specialists have done outstanding work in convincing the cultivators to use improved varieties and, in general, have convinced the cultivators to maintain varietal purity. In most sections the cotton trade, including the ginneries, has been willing to cooperate because they as well as the cultivators gain. Only in areas where the provincial or state government has failed to cooperate in passing one-variety laws has this system shown weaknesses. It is particularly noticeable in the Central Provinces and Berar and Madhya Bharat. The local Government in these two areas have failed to pass effective one-variety laws so that not only an improved variety but also one or more types of short cotton are grown. As a result, there is considerable mixing in some years of short staple cottons with the long-staple improved variety. This mixing is not only done by the cultivators but also by the ginners and sometimes by the merchants.

EXPORTS

Several years' cotton export statistics are not available for the area that is now the Union of India. If one can assume that exports from Bombay, Madras, Tuticorin, and Calcutta represent exports from India, however, it will be seen that there has been a gradual decline over the past 30 years. From 1920 through August 31, 1931, cotton exports averaged more than 2.5 million bales annually. After 1931, as the domestic textile industry expanded, exports declined. During the 9 years prior to World War II, Indian exports averaged 1.5 million bales. Exports naturally declined sharply during the war reaching an all-time low in 1944-45 of 47,367 bales. After the war in 1947-48, they increased to 777,467 bales, but have again declined and are not likely to become significant unless there is a widespread depression in the domestic textile industry.

For the 20 years prior to the war, Japan was by far the most important importer of Indian cotton. An average of more than a million bales was shipped to Japan annually. China was the second most important buyer of Indian cotton followed by Italy, France, Belgium, and England. Germany, Holland, and Spain also bought Indian cotton.

IMPORTS

Nearly all of the foreign cotton consumed by Indian mills is imported through Bombay. The mills of Bombay city and Ahmedabad consume practically all of the cotton imported from countries other than Pakistan. Prior to Partition, India imported an average of 449,000 bales of cotton. East African and Egyptian importations made up the greater part while Sudan furnished amounts varying from 30,217 to 170,683 bales. Over the past 2 decades, with the exception of 3 years, some cotton has been imported from the Western Hemisphere. The amounts have varied from 310,333 bales in 1926-27 to 1,633 bales in 1940-41. After the war, 10,617 to 57,167 bales of Western Hemisphere cotton were shipped through the port of Bombay. Unfortunately the Indian statistics do not differentiate between Brazilian, Peruvian, and United States cotton. It is to be assumed that a considerable part of this cotton was from the United States since many mills are familiar with California and Memphis growths.

CONSUMPTION

Only during the two mild depressions of 1919-20 and 1923-24 has Indian mill consumption declined below 2 million bales during the past 30 years. Since 1927-28, consumption has been gradually increasing, reaching a maximum during the war year of 1944-45. Since then the stimulus of war production has declined, but consumption has been at the rate of 4 million bales or more.

COTTON TEXTILE INDUSTRY

The Indian textile industry began on the west coast of India in 1851. By this time, there were a number of wealthy Parsic, Hindu, and Moslem merchants who had sufficient capital to install the necessary machinery to produce yarn. Practically all of this yarn was prepared for sale to China and the Far East. It was a number of years before the Indian textile industry made efforts to supply the domestic market. After the Civil War in the United States, a number of Indian merchants began the construction of textile mills to supply the domestic market. From 1866 to 1910 the industry grew rapidly both in spinning and weaving. During the latter part of this period, the industry began supplying the domestic market with yarn and cloth. During World War I the industry experienced a slight slump but quickly recovered in the early 1920's. The number of mills as well as spindles and looms (fig. 10) have continued

FIGURE 10.- There are 2.5 million hand looms in India, many of which are operated manually. Hand-loomed cloth is considered superior to mill cloth largely because of its ability to withstand the harsh treatment of the Indian laundry.

to increase since that time. By far, the greater part of the machinery used in the textile mills in India was bought second-hand from England. At present, much of it is obsolete, in bad running condition, and should be replaced if the price of cloth is to be lowered.

FOREIGN TRADE IN COTTON TEXTILES

Prior to the installation of mills in early 1920's, India imported much of its cloth from the United Kingdom. In fact during the 10 years prior to 1918, India took more than 40 percent of Britain's total cloth exports. As the Indian textile industry expanded, such imports declined until, in the 1930's, India took only about 20 percent of the United Kingdom cloth exports.

In the early 1920's, Japan entered the Indian cloth market, supplying nearly 500 million yards a year. This trade was mutually satisfactory since Japan also bought more than a million bales of Indian cotton. In 1933 the Indo-Japanese trade agreement was signed whereby Japan agreed to buy at least 1.5 million bales of cotton from India. This agreement was renewed in 1937 but was terminated by the war.

Prior to World War II, India exported a maximum of 220 million yards of cloth. During the 5 years, 1936-37 to 1940-41, exports were more than double those in the 5 years, 1931-32 to 1935-36. After the war began, India attempted to supply a major part of the former Japanese markets in the Far East and Africa. Exports reached a maximum of 820 million yards in 1942-43. Since then Indian exports have declined, but its exporters are fighting to maintain a substantial part of the nearby markets. At times Indian prices have been high in comparison with the prices of textiles from other countries. However, it is entirely possible that India will continue to claim an export market for more than 300 million yards for an indefinite period. This situation is likely to be true even though Pakistan does not buy Indian textiles. During much of 1948 and all of 1949, Pakistan bought cloth from other countries that buy Pakistan cotton. The Indian textile industry has begun a concerted drive to increase textile exports. The Government has cooperated by reducing the export tax and issuing export licenses freely to bona fide exporters provided the price is not substantially inflated.

India has imported some cotton cloth for many years. As long as there is a substantial demand for European-type clothes, such imports are likely to continue. Indian textile mills, for the most part, have not yet adapted their production methods to the types of cloth widely used for shirting and dress material. Many Indians also use imported poplins for making their native tunics.

APPENDIX

TABLE 4.- *Cotton acreage, India and Pakistan, 1936-37 to 1948-49*

YEAR	INDIA	PAKISTAN
	1,000 acres	*1,000 acres*
1936-37 to 1938-39	20,972	3,693
1939-40	18,216	3,364
1940-41	19,745	3,566
1941-42	20,468	3,683
1942-43	16,090	3,113
1943-44	17,427	3,659
1944-45	11,413	3,430
1945-46	11,349	3,319
1946-47	11,671	3,367
1947-48	10,655	3,122
1948-49	11,055	2,715

Source: Estimates of area and yield of principal crops in India, 1936-1946, Ministry of Agriculture, Government of India, Delhi, April 1948. Forecasts issued by the Governments of India and Pakistan.

TABLE 5.- *Cotton production, India and Pakistan,*[1] *1936-37 to 1948-49*

YEAR	INDIA		PAKISTAN	
	392-LB. BALES	480-LB. BALES	392-LB. BALES	480-LB. BALES
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*
1936-37 to 1938-39	4,059	3,315	1,594	1,302
1939-40	3,630	2,965	1,279	1,045
1940-41	4,357	3,558	1,723	1,407
1941-42	4,424	3,613	1,799	1,469
1942-43	3,086	2,520	1,616	1,320
1943-44	3,626	2,961	1,633	1,334
1944-45	2,173	1,775	1,407	1,149
1945-46	2,119	1,731	1,411	1,152
1946-47	2,600	2,123	1,600	1,307
1947-48	3,120	2,548	954	779
1948-49[2]	2,400	1,960	1,011	826

[1] Includes extra factory consumption.

[2] Bales 392 pounds net weight.

Sources: Idem

TABLE 6.- *Cotton consumption* [1] *in India, East Indian and foreign 1920-21 to 1948-49*
[In thousands]

YEAR	EAST INDIAN	FOREIGN	TOTAL
1920-21	(2)	(2)	1,731
1921-22	(2)	(2)	1,800
1922-23	(2)	(2)	1,757
1923-24	1,499	67	1,566
1924-25	1,776	42	1,818
1925-26	1,622	104	1,726
1926-27	1,668	306	1,974
1927-28	1,446	196	1,642
1928-29	1,627	138	1,765
1929-30	1,938	164	2,102
1930-31	1,853	297	2,150
1931-32	1,916	461	2,377
1932-33	1,928	389	2,317
1933-34	1,908	300	2,208
1934-35	2,133	417	2,550
1935-36	2,187	411	2,598
1936-37	2,150	420	2,570
1937-38	2,450	541	2,991
1938-39	2,573	539	3,112
1939-40	2,491	514	3,005
1940-41	2,954	518	3,472
1941-42	3,287	585	3,872
1942-43	3,517	477	3,994
1943-44	3,364	593	3,957
1944-45	3,397	612	4,009
1945-46	3,161	555	3,716
1946-47	2,626	618	3,244
1947-48	2,918	580	3,498
1948-49 [3]	2,960	574	3,534

[1] Bales of 480 net pounds.

[2] Not given separately.

[3] Estimated.

Source: Bombay Millowner Association, Bombay.

TABLE 7.- *Cotton mills, India*[1]*: Number of mills, spindles, looms, employees, and cotton consumed, selected years, 1851 to 1948*

YEAR	NUMBER OF MILLS	NUMBER OF SPINDLES (1,000)	NUMBER OF LOOMS (1,000)	AVERAGE DAILY NUMBER OF EMPLOYEES (1,000)	COTTON CONSUMED (1,000 BALES OF 480 POUNDS)
1851	1	-	-	-	-
1866	13	309	3	8	-
1876	47	1,100	9	-	-
1880	56	1,462	14	44	252
1890	137	3,274	23	103	823
1900	193	4,946	40	161	1,187
1910	263	6,196	83	234	1,580
1920	253	6,763	119	311	1,594
1925	337	8,511	154	368	1,818
1930	348	9,125	179	384	2,102
1935	365	9,685	199	415	2,550
1940	388	10,006	200	430	3,005
1945	417	10,238	202	510	4,009
1948	422	10,433	202	476	3,498

[1] Prior to 1937 included mills in Burma; prior to 1948 included mills in Pakistan.

Source: Bombay Millowners' Association.

TABLE 8.- *Exports of cotton cloth and yarn, India, 1930-31 to 1948-49*

YEAR	CLOTH	YARN
	1,000 yards	*1,000 pounds*
1930-31	97,715	23,473
1931-32	104,636	22,043
1932-33	66,442	15,108
1933-34	56,461	16,388
1934-35	57,693	12,789
1935-36	71,250	9,668
1936-37	101,636	12,137
1937-38	[1]241,255	[1]40,124
1938-39	176,992	37,960
1939-40	221,405	36,943
1940-41	390,144	77,509
1941-42	772,355	89,320
1942-43	817,991	34,240
1943-44	461,337	19,078
1944-45	423,021	16,918
1945-46	440,510	14,497
1946-47	318,318	3,791
1947-48	[2]192,422	[2]42
1948-49	340,865	7,407

[1] Includes Burma until March 31, 1937.

[2] Pakistan treated foreign destination since March 1, 1948.

Source: Director of Commercial Intelligence and Statistics, Calcutta.

TABLE 9.- *Imports of cotton cloth and yarn, India, 1930-31 to 1948-49*

YEAR	CLOTH	YARN
	Million yards	*1,000 pounds*
1930-31	890	29,140
1931-32	776	31,575
1932-33	1,225	45,103
1933-34	796	32,055
1934-35	944	34,022
1935-36	947	44,570
1936-37	764	28,520
1937-38	[1]591	[1]21,998
1938-39	647	36,459
1939-40	579	41,132
1940-41	447	19,334
1941-42	182	8,173
1942-43	16	945
1943-44	4	630
1944-45	5	192
1945-46	3	123
1946-47	16	217
1947-48	[2]28	[2]8,803
1948-49	47	11,071

[1] Including Burma until March 31, 1937.

[2] Pakistan treated foreign country since March 1, 1948.

Source: Director of Commercial Intelligence and Statistics, Calcutta.

TABLE 10.- *Planting and harvesting periods in India for selected varieties of cotton*

VARIETY	PLANTING	HARVESTING
Bengals	April-June	September-January
Comilla	May	October-December
4F and LSS	April-June	October-January
Oomras, Central India	June-July	do
Bani	June	October-December
Buri	do	November-January
Dholleras	June-July	December-March
Mathias	June	October-December
Broach-Surat	June-July	January-March
Comptas	August-September	February-March
Tinnevellies, Uppam, Karangannl	October-November	March-August
Westerns	August-September	January-May
Northerns	June-October	February-April
Coconada	July-September	January-April
Cambodia	September-October	April-July